

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended) A resist pattern thickening material consisting of:

at least one resin selected from a polyvinyl alcohol, a polyvinyl acetal, a polyvinyl acetate, a polyvinyl pyrrolidone and a hydroxylpropyl cellulose;

1.5625g to 3.125g with respect to 100g of the resin of at least one surfactant selected from a non-ionic surfactant, a cationic surfactant, an anionic surfactant, and an amphoteric surfactant, wherein

the non-ionic surfactant is selected from a polyoxyethylene - polyoxypropylene condensation product compound, a polyoxyalkylene alkylether compound, a polyoxyethylene alkylether compound, a polyoxyethylene derivative compound, a sorbitan fatty acid ester compound, a glycerin fatty acid ester compound, a primary alcohol ethoxylate compound, a phenol ethoxylate compound, an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant,

the cationic surfactant is selected from an alkyl cationic surfactant, an amide quaternary cationic surfactant, and an ester quaternary cationic surfactant, and

the amphoteric surfactant is selected from an amine oxide surfactant and a betaine surfactant;

water;

and optionally organic solvent, thermal acid generating agents and quenchers,
wherein the resist pattern thickening material is capable of thickening a resist pattern of
an ArF resist to be thickened.

2. (Original) A resist pattern thickening material according to Claim 1, wherein the resist
pattern thickening material is at least one of water-soluble and alkali-soluble.

3. – 4. (Canceled)

5. (Original) A resist pattern thickening material according to Claim 1, wherein the resin
is at least one of water-soluble and alkali-soluble.

6. (Canceled)

7. (Original) A resist pattern thickening material according to Claim 1, wherein the resin
has a cyclic structure in at least a portion thereof.

8. (Original) A resist pattern thickening material according to Claim 7, wherein the cyclic
structure is selected from at least one of an aromatic compound, an alicyclic compound, and a
heterocyclic compound.

9 – 12 (Canceled)

13. (Currently Amended) A resist pattern thickening material consisting of:

at least one resin selected from a polyvinyl alcohol, a polyvinyl acetal, a polyvinyl acetate, a polyvinyl pyrrolidone and a hydroxylpropyl cellulose;

1.5625g to 3.125g with respect to 100g of the resin of at least one surfactant selected from a non-ionic surfactant, a cationic surfactant, an anionic surfactant, and an amphoteric surfactant, wherein

the non-ionic surfactant is selected from a polyoxyethylene - polyoxypropylene condensation product compound, a polyoxyalkylene alkylether compound, a polyoxyethylene alkylether compound, a polyoxyethylene derivative compound, a sorbitan fatty acid ester compound, a glycerin fatty acid ester compound, a primary alcohol ethoxylate compound, a phenol ethoxylate compound, an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant,

the cationic surfactant is selected from an alkyl cationic surfactant, an amide quaternary cationic surfactant, and an ester quaternary cationic surfactant, and

the amphoteric surfactant is selected from an amine oxide surfactant and a betaine surfactant;

water;

an organic solvent and optionally thermal acid generating agents and quenchers,

wherein the resist pattern thickening material is capable of thickening a resist pattern of an ArF resist to be thickened.

14. (Original) A resist pattern thickening material according to Claim 13, wherein the organic solvent is at least one selected from an alcohol solvent, a chain ester solvent, a cyclic ester solvent, a ketone solvent, a chain ether solvent, and a cyclic ether solvent.

15. (Currently Amended) A resist pattern comprising:

a resist pattern thickening material to cover a surface of a resist pattern of an ArF resist to be thickened so as to thicken the resist pattern to be thickened,

wherein the resist pattern thickening material is applied onto the resist pattern to be thickened after forming the resist pattern of the ArF resist to be thickened, and the resist pattern thickening material consisting of:

at least one resin selected from a polyvinyl alcohol, a polyvinyl acetal, a polyvinyl acetate, a polyvinyl pyrrolidone and a hydroxylpropyl cellulose;

1.5625g to 3.125g with respect to 100g of the resin of at least one surfactant selected from a non-ionic surfactant, a cationic surfactant, an anionic surfactant, and an amphoteric surfactant, wherein

the non-ionic surfactant is selected from a polyoxyethylene - polyoxypropylene condensation product compound, a polyoxyalkylene alkylether compound, a polyoxyethylene alkylether compound, a polyoxyethylene derivative compound, a

sorbitan fatty acid ester compound, a glycerin fatty acid ester compound, a primary alcohol ethoxylate compound, a phenol ethoxylate compound, an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant,

the cationic surfactant is selected from an alkyl cationic surfactant, an amide quaternary cationic surfactant, and an ester quaternary cationic surfactant, and

the amphoteric surfactant is selected from an amine oxide surfactant and a betaine surfactant;

water;

and optionally organic solvent, thermal acid generating agents and quenchers.

16. (Currently Amended) A process for forming a resist pattern, comprising the steps of:

forming a resist pattern of an ArF resist to be thickened;

coating a resist pattern thickening material so as to cover a surface of the resist pattern of the ArF resist to be thickened;

forming a resist pattern in which the resist pattern of the ArF resist to be thickened is thickened;

wherein the resist pattern thickening material consists of:

at least one resin selected from a polyvinyl alcohol, a polyvinyl acetal, a polyvinyl acetate, a polyvinyl pyrrolidone and a hydroxylpropyl cellulose;

1.5625g to 3.125g with respect to 100g of the resin of at least one surfactant selected from a non-ionic surfactant, a cationic surfactant, an anionic surfactant, and an amphoteric surfactant, wherein

the non-ionic surfactant is selected from a polyoxyethylene - polyoxypropylene condensation product compound, a polyoxyalkylene alkylether compound, a polyoxyethylene alkylether compound, a polyoxyethylene derivative compound, a sorbitan fatty acid ester compound, a glycerin fatty acid ester compound, a primary alcohol ethoxylate compound, a phenol ethoxylate compound, an alkoxyate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant,

the cationic surfactant is selected from an alkyl cationic surfactant, an amide quaternary cationic surfactant, and an ester quaternary cationic surfactant, and

the amphoteric surfactant is selected from an amine oxide surfactant and a betaine surfactant;

water;

and optionally organic solvent, thermal acid generating agents and quenchers.

17. (Original) A process for forming a resist pattern according to Claim 16, wherein developing processing of the resist pattern thickening material is carried out after coating of the resist pattern thickening material.

18. (Currently Amended) A semiconductor device comprising a pattern formed by using a resist pattern of an ArF resist which has been thickened by a resist pattern thickening material wherein the resist pattern thickening material consists of:

at least one resin selected from a polyvinyl alcohol, a polyvinyl acetal, a polyvinyl acetate, a polyvinyl pyrrolidone and a hydroxylpropyl cellulose;

1.5625g to 3.125g with respect to 100g of the resin of at least one surfactant selected from a non-ionic surfactant, a cationic surfactant, an anionic surfactant, and an amphoteric surfactant, wherein

the non-ionic surfactant is selected from a polyoxyethylene - polyoxypropylene condensation product compound, a polyoxyalkylene alkylether compound, a polyoxyethylene alkylether compound, a polyoxyethylene derivative compound, a sorbitan fatty acid ester compound, a glycerin fatty acid ester compound, a primary alcohol ethoxylate compound, a phenol ethoxylate compound, an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant,

the cationic surfactant is selected from an alkyl cationic surfactant, an amide quaternary cationic surfactant, and an ester quaternary cationic surfactant, and

the amphoteric surfactant is selected from an amine oxide surfactant and a betaine surfactant;

water;

optionally organic solvent, thermal acid generating agents and quenchers.

19. (Currently Amended) A process for manufacturing a semiconductor device comprising the steps of:

forming a resist pattern of an ArF resist wherein, after forming a resist pattern of the ArF resist to be thickened on an underlying layer, the resist pattern of the ArF resist to be thickened is coated by a resist pattern thickening material so as to cover a surface of the resist pattern of the ArF resist to be thickened, so as to form a resist pattern in which the resist pattern of the ArF resist to be thickened is thickened;

patterning the underlying layer by etching by using the resist pattern;

wherein the resist pattern thickening material consisting of:

at least one resin selected from a polyvinyl alcohol, a polyvinyl acetal, a polyvinyl acetate, a polyvinyl pyrrolidone and a hydroxylpropyl cellulose;

1.5625g to 3.125g with respect to 100g of the resin of at least one surfactant selected from a non-ionic surfactant, a cationic surfactant, an anionic surfactant, and an amphoteric surfactant, wherein

the non-ionic surfactant is selected from a polyoxyethylene - polyoxypropylene condensation product compound, a polyoxyalkylene alkylether compound, a polyoxyethylene alkylether compound, a polyoxyethylene derivative compound, a sorbitan fatty acid ester compound, a glycerin fatty acid ester compound, a primary alcohol ethoxylate compound, a phenol ethoxylate compound, an

alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant,

the cationic surfactant is selected from an alkyl cationic surfactant, an amide quaternary cationic surfactant, and an ester quaternary cationic surfactant, and

the amphoteric surfactant is selected from an amine oxide surfactant and a betaine surfactant;

water;

and optionally organic solvent, thermal acid generating agents and quenchers.

20. (Previously Presented) A process for manufacturing a semiconductor device according to Claim 19, wherein a material of the resist pattern to be thickened is at least one selected from acrylic resists, cycloolefin - maleic acid anhydride resists, cycloolefin resists, and cycloolefin - acryl hybrid resists.